

# NCSX IPT Meeting Minutes

The minutes from the NCSX IPT meeting of Tuesday, August 28, 2007 at 1:00pm are as follows:

**Attendees:** DOE-PSO: J. Makiel

DOE HQ: B. Sullivan, K. Chao

ORNL: J. Lyon

PPPL: R. Templon, H. Neilson, J. Malsbury, J. Levine, N. Nassar

Welcome Nabil Nassar to the NCSX Project Team. Nabil will assist with project controls. Nabil can be contacted at email [nnassar@pppl.gov](mailto:nnassar@pppl.gov) or extension 3387.

## 1. DOE News (Barry/ /Kin)

- a) The NCSX Project has requested a modified FY08 funding split between PPPL and ORNL (\$13,900K & \$2,000K, respectively); (It was subsequently reported by OFES that this change has been implemented and will be reflected in the first FY-08 fin. plan.)
- b) An email was provided to the Project on August 28<sup>th</sup> that provides funding guidance to the Project as to formulate a more optimized project baseline scenario. The guidance is as follows:

FY 2008: +1.5M

FY 2009: +3-4M

FY 2010: +3-4M

## 2. Safety Management (Jerry)

- a) There were no NCSX related safety incidents;
- b) PPPL site-wide training for Lock-out/Tag-out is underway.

## 3. SC Project Review (Jeff/Barry/Hutch/Kin)

- a) The SC Project Review successfully occurred on Aug 15<sup>th</sup>-17<sup>th</sup>. Overall, the Review Committee determined that the proposed cost and schedule is 'achievable'.
- b) There are 23 recommendations that are summarized at the end of these minutes. Three significant recommendations are as follows:

- Project Integration: The Project has reorganized the management structure to accommodate improved integration and to replace the duties of the Engineering Manager who has left the Project. Additional engineers are also being sought.
  - Optimized Baseline: Project should prepare an alternate baseline scenario based upon an optimized funding profile. Given the improved but limited funding profile guidance (see 1b above), pushing design work forward (which was another Review recommendation) will be examined.
  - Restore Workscope: Provide an estimate to restore work removed from the project since the last re-baseline in July 2005 that is still required for Phase III operations and beyond. The Project Team is currently working on this estimate which includes an analysis of required trim coils to meet n=3.
- c) The final report will be written in the next week or so. A draft copy will be provided to SC-PSO and the Project Team for review/comment.

#### **4. Project technical progress (Hutch)**

The following provides a brief status on the major components:

##### MC Winding

Winding operations are proceeding well.

##### Field Period Assembly

The Field Period (FP) Assembly effort continues as follows:

Station #1 (VV prep - diagnostics, h/c tubes)

- a) Proceeding well with no noted issues. Work is nearing completion on the 3<sup>rd</sup> and final vacuum vessel section.

Station #2 (mating modular coils together)

- a) The design for the inboard region of the modular coil interface within a field period will be a welded joint. A developmental weld trial occurred. Deflection of the conductor due to weld distortion was noted and requires that a new shim design be developed as well as a new weld design. A 'production prototype' of two completed coils will be performed next using the modified shims and weld design.

##### TF Coils

- a) The first TF coil has been delivered;
- b) The second TF coil will be delivered in about 1 week. Work continues on the 3<sup>rd</sup> and 4<sup>th</sup> TF coils at Everson. Winding of the 5<sup>th</sup> coil has started.

## Design Reviews

Several design reviews as noted above have been successfully completed or continue to occur in the near future.

### **5. Procurement (Rod)**

- a) Approximately \$112K of assembly parts are in the procurement process to support FPA station #2 activities. Procurement is also processing approximately \$256K in purchase orders.

### **6. Review of critical issues (Hutch)**

The Project has now deployed the use of a Risk Registry to track issues. The most notable issues impacting critical path as noted in the last IPT are updated as follows:

- a) Modular coil interface regarding the inboard region of 'within field period' flange interface. See 'Technical' section (paragraph 4) above.

### **7. Planning for the next 6 months (Jeff/Hutch)**

The following activities will continue:

- Continue to support the Project's re-baseline goal and address SC Project Review Committee's finding and recommendations;
- Modular Coil winding;
- Complete Field Period Assembly Station #1, and commence Station #2 activities including production prototyping of welded interface design;
- Off-site fabrication of TF coils;
- Design preparation for Field Period Assembly Stage #3;
- Continue efforts to recruit a permanent Project Manager. A Search Committee has been established and it is anticipated that a new Manager will be brought on-board as soon as possible to ensure adequate overlap period with Dr. Anderson.

Upcoming Level II milestones are as follows:

A new schedule of level I and II milestones are proposed for the Project as part of the re-baseline package. Upcoming 'unofficial' level II milestones proposed in the new project baseline are:

Nov 2007: MC Interface FDR (excluding C-C)

Dec 2007: Deliver TF Coils for FPA #1 Assembly (Qty=4)

Dec 2007: Shims for 1<sup>st</sup> MC Half Period Assembly (Station #2) Available

## **8. Project performance through July (Jeff)**

Costs (end of July) = \$69,812K.

The project continues to be graded “Red” because the Project’s baseline is no longer deemed credible. It was determined that the Project should continue to formally track against the existing baseline, as per ECP53, at least until the SC Project Review in August or until the end of the fiscal year. A determination will be made thereafter as whether to continue with the existing baseline, or track against the proposed baseline. In the interim, the Project will informally track against the proposed baseline as well as the current approved baseline.

## **9. ECP status (Jeff)**

The following are current and anticipated Engineering Change Proposals (ECPs) that require DOE approval:

- a) There are currently no ECPs pending DOE approval. An ECP will be developed to support the project’s re-baseline in fall/winter.

## **10. Planned IPT meetings (and other events) are as follows:**

Sept 7<sup>th</sup> ..... Briefing to Under Secretary on SC Project Review’s findings  
Sept 15-16..... NCSX Science Review  
Sept 18<sup>th</sup> ..... Next IPT Meeting

# SC Review Recommendations

## August 2007

### Magnets

- Accelerate specific engineering efforts such
  - PF coil design
  - Trim coil design
- Perform cost/benefit analysis of installing additional trim coils

### Auxiliary Systems

- Fueling & Vacuum Systems: Move up PDR schedule
- Diagnostics: Press on to meet schedule.
- Electrical Power: Move up PDR schedule.
- I&C: Conduct safety systems design interface with ES&H
- Facility: Study cryogenic system design regulation for multiple parallel paths.

### Field Period Assembly & Machine Assembly

- Scrub the RLS, WAF's, and BOE's for accuracy traceability and completeness
- Consider accelerating schedule of PDR's and FDR's to encourage early design activity and solidify estimates.
- Include objective experts external to the project on design review teams
- Include all integration issues associated with related assembly tasks in design reviews
- Add vacuum vessel welding (in Station 6, Final Assy) to the Risk Registry and develop appropriate mitigation activities
- Continue to include dry-run fit-ups of the Final Assembly of Modular Coils in the RLS, and plan to perform these tasks even if metrology results appear to "close" properly
- Continue to look for opportunities to validate assembly design concepts early in the design process
- Ensure that engineering integration across WBS tasks occurs at a high level including interface design consistency, definition and scheduling of design reviews, and engineering resource management. This will require the focus of the responsible engineer as his/her primary activity

### Phase III and IV Scope

- Investigate the cost and benefit of inclusion of four additional trim coils into the upgrade plans. Present plans will augment the two coils in the MIE with two additional coils, so that  $n=1$  and  $n=2$  fields can be applied. The addition of two more would provide for control over natural ( $n=3$ ) islands
- Coordinate cost and schedule planning between NCSX and NSTX. In FY13, a \$25M increase in the NCSX program total occurs as NCSX goes into Phase III operation and the two devices go to alternate year operations. The total available funds must be commensurate with NCSX operations and NSTX station-keeping and upgrade costs and the reverse in the alternate years and with OFES funding

### Cost Estimate

- Institutionalize the new cost and schedule methods and tools (ongoing)
- Improve the basis of estimate - improved quality bases of estimates (well before the EIR)
- Ensure the machine capabilities in the FY 2005 baseline and the new proposed baseline are consistent

### Schedule and Funding

- Improve the basis of estimate - improved quality of bases of estimates (well before the EIR)

### Management

- Develop an alternate cost/schedule baseline based on an "optimum" funding profile.
- Provide strong leadership in the systems engineering and integration area.